Claims

1. An apparatus for displaying image comprising means for collecting image data of a person being examined, means for forming a tomogram from said image data, means for calculating at least one biological function data from said tomogram, means for forming at least one functional image based on said biological function data, means for forming a composite image by composing said tomogram and at least one of the following images; an operated image obtained by operating said functional images together, a composite image obtained by composing said functional images together, said operated image, and said functional image; and display means capable of displaying said functional image, said operated image, said tomogram and said composite image, wherein the means for forming said functional image and the means for forming the composite image work to display at least portions of the regions in said functional image and in said operated image on an arbitrary gradation color scale corresponding to the evaluated value of said biological function data, and other regions in said function image and in said operated image are displayed in an arbitrary color which is not included in said gradation color scale, or are displayed transparently.

2. An apparatus for displaying image according to claim 1, wherein said composite image is displayed by any one of an

overlapped display, a parallel display or a partial display.

3. An apparatus for displaying image according to claim 1 or 2, wherein means for forming said functional image sets to zero the ratio of said functional image in other regions in said functional image.

4. An apparatus for displaying image according to any one of claims 1 to 3, wherein means for forming said functional image is capable of arbitrarily varying the gradation color scale allocated to said biological function data.

5. An apparatus for displaying image according to any one of claims 1 to 4, wherein means for forming said composite image is capable of arbitrarily setting the ratios of the functional images in said composite images and of said tomogram.

6. An apparatus for displaying image according to any one of claims 1 to 5, wherein means for forming said functional image specifies part of the regions in said functional image depending upon whether the image data value of said pixel unit lies inside or outside a predetermined range.

7. An apparatus for displaying image according to any one of claims 1 to 6, wherein means for forming said functional image determines an arbitrary interested region in said functional image as region of interest in said functional image.

8. An apparatus for displaying image according to any

one of claims 1 to 7, wherein means for forming said functional image renders the pixel values of the pixels of the image data on a predetermined window level and in a predetermined window width to be corresponded to conversion coefficients, and determines said gradation color scale based on the conversion coefficients.

9. An apparatus for displaying image according to any one of claims 1 to 8, wherein means for forming said functional image determines the gradation color scale allocated to said functional image depending upon the pixel values of the pixels of the image data for each of RGB and upon various look-up tables to which the conversion coefficients are corresponded.

10. An apparatus for displaying image according to any one of claims 1 to 9, wherein said biological function data is at least one of the blood flow function data as represented by blood volume, blood flow and mean transit time.

11. A method of displaying image comprising a step of collecting image data of a person being examined, a step of forming a tomogram from said image data, a step of calculating at least one biological function data from said tomogram, a step of forming at least one function image based on said biological function data, a step of forming an operated image by operating said function images together, for forming a composite image by composing said tomogram and at least one of the following images; an operated image obtained by

operating said functional images together, a composite image obtained by composing said functional images together, said operated image, and said functional image; and a display step capable of displaying said functional image, said operated image, said tomogram and said composite image, wherein the step of forming said functional image and the step of forming the composite image work to display at least portions of the regions in said functional image and in said operated image on an arbitrary gradation color scale corresponding to the evaluated value of said biological function data, and other regions in said functional image and in said operated image are displayed in an arbitrary color which is not included in said gradation color scale, or are displayed transparently.

12. A method of displaying image according to claim 1, wherein said composite image is displayed by any one of an overlapped display, a parallel display or a partial display.

13. A method of displaying image according to claim 11 or 12, wherein the step of forming said functional image sets to zero the ratio of said functional image in other regions in said functional image.

14. A method of displaying image according to claims 11 to 13, wherein the step of forming said functional image is capable of arbitrarily varying the gradation color scale allocated to said biological function data image.

15. A method of displaying image according to any one

of claims 11 to 14, wherein the step of forming said composite image is capable of arbitrarily setting the ratios of the functional images in said synthetic images and of said tomogram.

16. A method of displaying image according to any one of claims 12 to 15, wherein the step of forming said functional image specifies part of the regions in said functional image depending upon whether the image data value of said pixel unit lies inside or outside a predetermined range.

17. A method of displaying image according to any one of claims 12 to 16, wherein the step of forming said functional image determines an arbitrary interested region in said functional image as region of interest in said functional image.

18. A method of displaying image according to any one of claims 11 to 17, wherein the step of forming said functional image renders the pixel values of the pixels of the image data on a predetermined window level and in a predetermined window width to be corresponded to conversion coefficients, and determines said gradation color scale based on the conversion coefficients.

19. A method of displaying image according to any one of claims 11 to 18, wherein the step of forming said functional image determines the gradation color scale allocated to said functional image depending upon the pixel values of the pixels

of the image data for each of RGB and upon various look-up tables to which the conversion coefficients are corresponded.

20. A method of displaying image according to any one of claims 11 to 19, wherein said biological function data is at least one of the blood flow function data as represented by blood volume, blood flow and mean transit time.

Fig. 2

201 - COLLECTION OF DATA

202 - FORMATION OF A TOMOGRAM

203 - DISPLAY OF THE TOMOGRAM

204 - ANALYSIS OF BIOLOGICAL FUNCTION DATA

205 - MAPPING

206 - DISPLAY OF IMAGE

207 - FORMATION OF COMPOSITE IMAGE

208 - DISPLAY OF IMAGE

Fig. 3

1 - CONVERSION COEFFICIENT C

2 - PIXEL VALUE P

PMAX - MAXIMUM PIXEL VALUE

CMAX - MAXIMUM CONVERSION COEFFICIENT VALUE

Fig. 4

LUT FOR FUNCTIONAL IMAGE 1

CONVERSION COEFFICIENT C

LUT FOR FUNCTIONAL IMAGE 2

CONVERSION COEFFICIENT C

LUT FOR FUNCTION IMAGE M

CONVERSION COEFFICIENT C

Fig. 5

1 - CONVERSION COEFFICIENT

Rl - MINIMUM COMPONENT R

Rh - MINIMUM COMPONENT R

Gl - MINIMUM COMPONENT G

Gh -MINIMUM COMPONENT G

Bl - MINIMUM COMPONENT B

Bh - MINIMUM COMPONENT B

CMAX - MAXIMUM CONVERSION COEFFICIENT

Fig. 6

LUT FOR TOMOGRAM

CONVERSION COEFFICIENT C

Fig. 9

301 - COLLECTION OF DATA

302 - FORMATION OF A TOMOGRAM

303 - DISPLAY OF THE TOMOGRAM

304 - ANALYSIS OF BIOLOGICAL FUNCTION DATA

305 - MAPPING

306 - DISPLAY OF FUNCTION IMAGE

307 - IMAGE OPERATION NECESSARY

308 - FORMATION OF OPERATED IMAGE

309 - CONDITIONS ARE SET

310 - FORMATION OF A COMPOSITE IMAGE

311 - DISPLAY OF THE COMPOSITE IMAGE

Fig. 11

BEFORE THE THERAPY

Fig. 12

AFTER THE THERAPY

Fig. 13

COMPOSITE IMAGE OF CT IMAGE AND DIFFERENTIAL IMAGE OF BEFORE AND AFTER THE THERAPY

Fig. 14

BEFORE THE THERAPY (CEREBRAL BLOOD VOLUME IMAGE)

Fig. 15

AFTER THE THERAPY (CEREBRAL BLOOD VOLUME IMAGE)

Fig. 16

COMPOSITE IMAGE OF CT IMAGE AND DIFFERENTIAL IMAGE OF BEFORE AND AFTER THE THERAPY